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Fresh Water in the Maningrida Region's Hybrid Economy: Intercultural Contestation over Values and Property Rights

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Foreword

This report was commissioned by the Indigenous Water Policy Group established by the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) in 2006. The Indigenous Water Policy Group project aims to build the capacity of Indigenous organisations in north Australia in order to understand and influence the National Water Initiative policy agenda. This Group has been established to oversee the conduct of research activities, to consider and endorse policies, engage with water policy makers, and to improve awareness of National Water Initiative issues in the wider Indigenous communities of northern Australia.

Specifically the NAILSMA project aims to articulate the least known aspects of water policy particularly relevant to north Australia's Indigenous population i.e. issues relating to property rights, use and management by Indigenous people. General research areas were proposed in the original funding application to Land & Water Australia (LWA) in 2005 and included:

1. institutional frameworks that embrace the articulation between Western water resource law and policy and customary water use, rules and norms

2. mechanisms to enhance the participation of Indigenous people in multi-stakeholder and collaborative water management structures and processes including methods to evaluate and bench-mark Indigenous participation

3. barriers to the incorporation of Indigenous values, rights and responsibilities in water (e.g. Indigenous institutional capacity), and

4. identification of potential incentives to overcome barriers (e.g. land and possible water use agreements, conflict resolution).

The funding application to Land and Water Australia noted that these were preliminary suggestions that would require further input from the Indigenous Water Policy Group and refinement in the early stages of the project. At its first meeting in November 2006 the Indigenous Water Policy Group confirmed the suitability of these general topics to be examined through brief case studies, desk top reviews and through interaction with Land Councils and other relevant Indigenous organisations.

This report on fresh water in the Maningrida Region's hybrid economy describes the results of one of the four case studies undertaken during 2007, each with different emphases. Other case study locations are Katherine (NT), Gulf of Carpentaria (Queensland) and the Ord River (WA). A report synthesising the results from all four case studies will be completed in coming months.

Acknowledgements

I would like to thank the executive of the BAC and its senior management team, especially Ian Munro, for facilitating and collaborating in this research. Wayne Campion a senior Rembarrnga man, assisted me greatly as research assistant while I undertook fieldwork in Maningrida, while Virginie Branchut (who now coincidently lives and works in Maningrida) assisted me greatly as a graduate research assistant in Canberra in late 2007 and early 2008. I would like to thank the numerous people, mainly Aboriginal, with whom I worked in Maningrida including the late Vern Peck and also staff of the Power and Water Corporation—Indigenous Essential Services including Darryl Day, Sallyann Nepe, Amy Dysart and Tony Beale. Michael O'Donnell assisted me with some legal commentary while Ian Munro, Bill Fogarty, Hannah Bulloch, Melinda Hinkson, and especially Sue Jackson provided helpful comments on an earlier draft of this report. I also appreciate of the efforts of Joe Morrison and Lorrae MacArthur of NAILSMA who have been responsible for managing the project.

All errors and omissions are the responsibility of the author.

Introduction

This report presents preliminary research about fresh water governance arrangements in the Maningrida region of some 10,000 square kilometres in Arnhem Land, Northern Territory. Initially it was anticipated that the issues to be addressed in this particular context would be reasonably straightforward. The Maningrida region is located in tropical north Australia where there is a seasonal abundance of water. And central Arnhem Land forms part of the Arnhem Land Aboriginal Trust, land held under inalienable Aboriginal title following passage of the *Aboriginal Land Rights (Northern Territory) Act 1976* (hereafter, *Land Rights Act*). Prior to that, it was Crown land reserved for exclusive Aboriginal use since the early 20th century. Currently under the Northern Territory's water administration regime it is an unallocated system where no licences for commercial use of surface or ground water have been allocated.

This research began in 2007 before the formation of the Northern Australia Land and Water Taskforce by the Howard government. Despite the heightened national interest in issues associated with water availability and use, largely driven by prolonged drought in south eastern Australia and the potential impact of climate change on water availability, any notion of water scarcity or need for demand management have not extended to the remote Maningrida region. Indeed, water concerns in general have focused to a far greater extent on extreme climatic events like the devastating impact of Tropical Cyclone Monica in April 2006. While both Aboriginal and non-Aboriginal people residing in the region are well aware of the drought and climate that is afflicting southern Australia, such issues do not have any practical regional significance, besides occasional jocular discussion about the possibility that seasonally surplus water from the region might be piped elsewhere.

But as this research has progressed an unimagined complexity of water governance issues has been revealed. This complexity can be explained by a combination of the following key factors:

- The region has a relatively short colonial history. Maningrida township was established just over 50 years ago in 1957 as an instrument of state policy. Partly because of this short engagement with the state, distinct Aboriginal customs, beliefs and institutions remain robust.

- Today, Aboriginal people in the region abide by both western and customary institutions, they live biculturally, but there is an emerging connectivity between these two ways of living captured by the term 'intercultural'.

- There are diverse living arrangements in the region. People live in Maningrida, but also at over 30 outstations in the hinterland and increasingly in a highly mobile manner between town and country.

- The regional economy is a hybrid, encompassing market and customary (non-market) sectors and values and including a significant state (or public) sector. There are considerable overlaps between the three sectors of this unusual contemporary economy.

- Property rights in water are locally contested. While the state asserts crown ownership of water, this is not a view that is shared by traditional owners of the land. Legally, Native Title law guarantees traditional owners unfettered customary rights in water. However, the relationship between land rights and fresh water rights remains unclear and legally untested.

- There is a clear duality in water management in the region, with water in the township being managed and regulated by the Power and Water Corporation (PAWA)[1], a Northern Territory utility. Domestic water in the hinterland is provided at small settlements called outstations by the Bawinanga Aboriginal Corporation (BAC), a regional Aboriginal organisation.

- The Djelk community rangers, an environmental services arm of Bawinanga provide some formal water management services at the landscape scale, focusing especially on water quality. Informal services are provided by Maningrida and outstation residents often as a positive externality of harvesting and other activity on country.

- While there is some regional variation, there is an overarching Aboriginal view that water is a resource with inseparable cultural and economic values, significant water places have high religious and livelihood values. This is in marked contrast to western notions of water as a resource with competing commercial and environmental/recreational values.

There are other broader political, environmental and cultural factors that complicate water governance issues in the Maningrida region.

Historically, in the period 1957–1972, state authorities totally dominated the regional polity and asserted ownership of water, particularly for state-sponsored commercial ventures. The state also tried to regulate people's place and mode of living encouraging centralisation in Maningrida and mainstream work. Since 1972 this state dominance has been challenged and eroded during a period of decolonisation.

Environmentally, while the region is generally viewed as comprising homogenous tropical savanna, it is in fact ecologically very diverse. This diversity was reflected in precolonial times in variable settlement and land ownership patterns and forms of customary economy. Today, such environmental variability continues to influence the nature of people's engagement with water and natural resources and the local specificities of highly variable 'hybrid economies', as well as the nature of mobility and communications between Maningrida and the hinterland.

Culturally, the people of the Maningrida region exhibit extraordinary linguistic and cultural diversity. Precolonially, this was a region where two distinct cultural blocs meet, the Kuninjku/Bininj Kunwok bloc to the west of the region and the Yolngu cultural bloc to the east. Berndt and Berndt (1970) identified the transition from west to east occurring in the region of the Tomkinson Flood Plains, a resource-rich

1 PAWA was the statutory Power and Water Authority; while now corporatised it is still referred to as PAWA, not PAWC.

wetlands area. While precolonially there was mixing between these two culture blocs at the margin, within each there were a number of distinct language communities. Today there is a greater social mixing between linguistic communities, but the region remains extraordinarily linguistically and culturally rich and diverse with at least 13 major languages spoken. This diversity extends to some differences in cultural views about water.

This report is structured as follows. I begin with a discussion of methodology before turning to a description of the region's water resources. The bulk of the report focuses on three linked broad perspectives on water: a historical analysis of the political economy of water; a sectoral analysis of water in the regional 'hybrid' economy; and a spatial analysis of water governance in Maningrida and the hinterland. Next these three perspectives are combined in a discussion about cross-cultural contestation over water values and property rights; and finally early steps that might be taken to ameliorate such contestation are outlined. In conclusion, I suggest that a new water governance paradigm might be needed in this region that lies 'beyond the water allocation system'.

A feature of the report is a series of dichotomies both between western and Aboriginal views about water, but also in recent times within the Aboriginal domain. These dichotomies are rarely discrete and, as will become apparent, it is often when there is overlap between western and customary views that there is greatest contestation over water resource rights.

Methodology and caveats

The report is informed by a body of research undertaken by the author in the Maningrida region since 1979. Between 1979 and 2008, 39 field visits have been made to the region with much research focused on outstation living, natural resource management, wildlife utilisation and the arts industry (all very water dependent activities). However, it was only in June and November 2007, under the sponsorship umbrella of the BAC, that research was more specifically focused on fresh water. Even then it should be noted that this research was linked to work on governance and land rights undertaken during the same period.

The research methodology employs three main strands:

- Literature review: There is a considerable literature on the Maningrida region going back to the late 1950s when the township was first established. Much of this literature deals with issues linked to water governance, on the cultural values of water and on the customary economy. There is also a significant official 'government' literature like the annual reports of the Welfare Branch of the NT Administration that deals directly with water issues.

- Interviews with agencies and other researchers: Discussions were held with regional organisations and government agents in the Maningrida region, as well as in Darwin, on formal and legal aspects of water management. In particular, staff of the PAWA—Indigenous Essential Services and of the NT

Department of Natural Resources, Environment and the Arts were extremely helpful.

- Interviews and discussions with Aboriginal land owners: During fieldwork, especially in June 2007, discussions were held individually and in small groups with a large number of Aboriginal people in the Maningrida region. Much of this discussion focused on customary aspects of fresh water, but local perspectives on broader water management issues were also canvassed. These interviews were generally unstructured although often initiated with questions about the ceremonial and totemic significance of water. The executive members of BAC were especially helpful in these free ranging discussions as were some senior traditional owners of Maningrida township. Of special importance was Rembarrnga linguist Wayne Campion who worked with me during my visit brokering discussions on this topic with a number of indigenous and non-Indigenous interest groups in Maningrida.

This methodology has a number of shortcomings that should be noted:

- The published and grey literature on the Maningrida region is so voluminous that it cannot be comprehensively covered here, so an attempt has been made to be both strategic and selective in choice. For example, in discussing the customary economy the focus is principally on two sites, Kopanga (Meehan 1982) and Mumeka (Altman 1987, 2003a), one coastal, one riverine. Similarly, in discussions of the cultural significance of water in ceremony and in art only a few cases have been selected.

- While the study was auspiced by BAC, an outstations resource agency, research has sought to focus broadly on all regional interests. While historically I have worked primarily with the Kuninjku language community whose lands lie to the south-west of Maningrida field research reported here is broadly representative of members of numerous language groups who were interviewed.

- While an attempt is made to place this research in an important regional historical context, this history is by necessity extremely potted, focusing only on key events in the colonial and post-colonial periods.

This report focuses very specifically on the Maningrida region and does not address the comparative theoretical and ethnographic literature at this juncture. Arguably the particularities and complexities of this case might preclude the need for such a comparative analysis, a question that will be left for another time.

The study region: Fresh water resources

The Maningrida region is located entirely within the Arnhem Land Aboriginal Trust region that encompasses entire river catchments. The region is administratively defined as the service region of about 10,000 sq kms bounded by the Glyde River to the east, Marrkolidjban Creek to the west, the Cadell River to the south (at

Kolorbidahdah) and the Arafura Sea to the north. Of particular significance to the region examined here are the Mann-Liverpool and Cadell-Blyth Rivers catchments. Figure 1 depicts the study region and also shows topography, major languages spoken, the location of Maningrida township and outstations, and the formed roads network that connects these communities.

The region's rainfall is typically Top End tropical. Daily rainfall statistics have been collected for Maningrida since 1958 at Bureau of Meteorology site 014400 MANINGRIDA (latitude 12.05 degrees south; longitude 134.23 degrees east, elevation 11 metres). These will not be summarised in any great detail here except to note the following rainfall statistics. Mean annual rainfall is 1305 millimetres (mm) with highest annual recoded rainfall being 2174 mm in 1964 and lowest annual recorded rainfall being 689 mm in 1990. Rainfall is strongly monsoonal with wet seasons running from December to April and dry seasons from May to November. March is the wettest month (293 mm average) and August is the driest (0.1 mm average). (More detail is available at Appendix A and http://www.bom.gov.au/)

It should be noted that there is already embedded in these data a cultural divergence. Bureau of Meteorology information is collected on a daily basis and made available on a Gregorian calendar basis emphasising wet and dry seasons, while Indigenous seasonality is classified into at least six seasons (Altman 1987: 25) with seasonality highly dependent on actual weather conditions rather than time of year.

The western distinction between ground and surface water that is now dominating discussions about water governance is not so prominent in Indigenous classifications (although the inter-connections between the two are strongly recognised in extant religious beliefs) but has growing relevance in relation to contemporary access to water especially for domestic, but also for commercial, use.

Figure 1. The Maningrida region

Ground water

According to hydrological research conducted by the Conservation and Natural Resources (CNR) Group (of the Department of Infrastructure, Planning and Environment) (2003: 16), the sandstone around Maningrida—Marchinbar Sandstone—forms part of the Arafura Basin which is made up of a series of sandstone and mudstone units. Good supplies of water have been retained where the sandstone has been fractured, thereby allowing water to be stored in aquifers. The research indicates that most groundwater in the area is of very good quality and fit for human consumption with low Total Dissolved Solids levels (a measure of the salinity of the water) (Conservation and Natural Resources Group 2003: 6).

The aquifer which lies under Maningrida township is classified as a high yielding aquifer with bore yields being typically above 5 litres/second (Conservation and Natural Resources Group 2003: 15). This aquifer extends north-west of Maningrida to Njudda Point and south-east to the Blyth River, taking the shape of a large arm. The surrounding region around Maningrida, where most outstations are located, has poorer access to ground water. Much of the area south of Maningrida township and north-east of Mumeka outstation (see Figure 1) for example is characterised by underlying hard rocks such as granite, hard sandstones and schist which form poor

aquifers with only small, isolated supplies available (Conservation and Natural Resources Group 2003: 19). It is also worth noting the report's warning that in rugged terrain such as on the Arnhem Land plateau, prospects for drilling are particularly limited due to poor vehicular access for rigs.

The remaining Maningrida area is characterised by a 'homeland supply' type of aquifer to the north of the township which can yield a typical homeland supply of 0.5 to 5 litres per second (l/s), and by a 'small homeland supply' type of aquifer to the south. These are the shallow aquifers which typically yield only 0.5 l/s (Conservation and Natural Resources Group 2003: 18).

Groundwater investigations conducted around Maningrida have identified two aquifers in the Marchinbar sandstone, one upper and one lower. The lower aquifer has been identified as the high yielding one and its sustainable yield has been assessed in the order of 1.5 million cubic metres per year which is the equivalent of 47 l/s, over an area of 10 square kilometres (Conservation and Natural Resources Group 2003: 35–36). Bores drilled in this aquifer typically yield around 10 l/s while the upper aquifer yields about 5 l/s or enough for a homeland supply. The yield of the lower aquifer is indicative of a good supply across a wide region indicating that the difficulties experienced in the past in supplying enough water for Maningrida residents (see below) will no longer exist.

These data indicate that directly around Maningrida Township there is potential for substantial water use but that further away from the main aquifer supply is more limited with possible consequences in terms of water supply management and water consumption for people on country. It is unlikely that the hinterland could support large population concentrations or intensive agriculture. It also indicates that springs and river water are essential for the viability of outstation communities.

Surface water

The volume and flow of surface water such as billabongs, river pools, rivers and springs vary according to wet and dry season rainfall and evaporation rate fluctuations. Only surface water with sufficient baseflow or groundwater discharge will persist through the dry season (Conservation and Natural Resources Group 2003: 23). The Liverpool River south of Maningrida is categorised by the CNR Group (2003: 28) in the category of 'River with permanent waterholes or flows up to 10 l/s at the end of the Dry season'. This category indicates a potential water supply for outstations with river flow which ceases during the dry season, but maintains permanent waterholes (Conservation and Natural Resources Group 2003: 28). Many rivers in the area will cease to flow completely, particularly during long dry periods between May and December.

By contrast, the Blyth River will always flow in excess of 100 l/s along any significant length of the river (Conservation and Natural Resources Group 2003: 28). It has its source in the sandstone plateau country and flows through dry woodland to within 40 kilometres (km) of its mouth where the waters of the river mingle with the tidal waters and becomes brackish (Meehan 1982: 10). This is where the river's floodplain lies and which is seasonally inundated by the wet season rains. At its mouth the river

is 1 km wide and flows into Boucaut Bay. Behind the coastal dunes is a complex swamp environment. Old sand dunes can be found inland which support elements of monsoon thickets and pandanus groves, dense monsoon jungles and freshwater swamps.

Given that rivers have little rain water to ensure a continuous flow during the dry season, all perennial (permanent) and ephemeral (seasonal) springs are important sources of water and most are also sacred sites. These springs are particularly important for maintaining dry season flow in creeks and rivers, and most of them sustain small rainforest or pandanus/paperbark swamp pockets (Conservation and Natural Resources Group 2003: 33).[2]

A number of springs located south of Maningrida, along the escarpment at the source of the Tomkinson River, have been located on the Water Resources map produced by the CNR Group. The springs are said to have a good discharge volume which is an indication of a high yielding aquifer in the sandstone sediments although no drilling has occurred in that area. Many of the remaining springs located by the CNR Group appear to be in areas of apparently low groundwater availability.

The CNR Group report warns against ill-planned development in the region which could negatively impact on the natural environment, by relying on groundwater availability while failing to consider the connectivity and interdependence of groundwater and natural groundwater discharges such as springs and creek flows (Conservation and Natural Resources Group 2003: 37). Groundwater dependant ecosystems such as rainforest pockets and perennial waterholes which are numerous in this region could be seriously damaged by inappropriate bore locations. Alterations to water resources would also impact on Aboriginal cultural and economic use of the landscape such as floodplain areas which are rich in food resources exploited by Aboriginal people (Meehan 1982; Altman 1987; Langton 2002: 57).

The high awareness and deep understanding that Aboriginal people have of this connectivity is evident in the most sacred Creation stories which depict the route taken by the mythical Being the Rainbow Serpent who is said to have travelled underground between various water places. Furthermore, the detailed knowledge held by people is said to have been invaluable in helping the CNR Group team locate remote springs and determine whether these were perennial or ephemeral (Conservation and Natural Resources Group 2003: 32). This knowledge in itself is proof of the importance of those springs to local Aboriginal people. Local knowledge also helped to establish records of the historical behaviour of water places (Zaar 2003: 4). The frequent occurrence of water themes throughout local mythology, which is examined in more details in a later section, is testimony to the detailed understanding local Aboriginal people have of the ecology of water places, as well as of their economic and spiritual significance.

2 Pandanus is particularly important as a raw material in fibre art production which is highly valued for both customary and commercial purposes. The links between water and commerce are discussed further later.

The political economy of water: Historical perspective

Arnhem Land was nominally a part of the Commonwealth-controlled Northern Territory from 1911; and by 1931 all of Arnhem Land was gazetted as reserved for Aboriginal people under the Crown Lands Ordinance. Effectively, however, people in the Maningrida region have had a relatively short history of external contact, with continual state colonisation of the region only dating from 1957. In a relatively short time of just over 50 years there have been a series of rapid transformations in water power relations that are summarised here in terms of three dominant phases, defined as precolonial, state colonial and post-colonial.

Precolonial: Before 1957

Up until the immediate post-World War Two period there was almost no European intrusion into the Maningrida region besides occasional expeditions by explorers and two significant patrols in 1939 and 1955 by Gordon Sweeney that found those Aboriginal people located leading a '*traditional*' precolonial lifestyle based on hunting, fishing and gathering. These two foot patrols were punctuated in 1949–50 by the establishment of a trading post at the mouth of the Liverpool River at a place called Maningrida on the traditional land of the Dhukurrdji people who are Ndjebbenna speakers. An important attraction of the site was a perennial sacred spring called Djómi where Mermaids are believed to reside. The trading post established by the Native Affairs Branch of the NT Administration was abandoned after a year due to budget cuts (Kyle-Little 1957).

The precolonial mode of living for Aboriginal people who resided in the immediate vicinity of Maningrida (described in Poignant with Poignant 1996 for 1952) and in the hinterland was based on hunting, fishing and gathering that was, in turn, entirely dependent on the exploitation of natural resources for livelihood. Fresh water played a crucially important role in this economy and was governed in a manner largely undifferentiated from other natural resources. Land owners had primary ownership rights over surface water, similar to a riparian right. But water was also treated as open access common property for travellers or visitors who needed to consume water for survival. People led a mobile lifestyle, but residence on the banks of major rivers and exploitation of resource-rich seasonal wet lands was the norm built into the seasonal cycle. As with other resources, there was no overarching regional authority over water, it was owned and managed at the local level by small land-owning corporate groups (patrilineal clans) who validated their political rights at regular regional ceremonial gatherings.

The state colonial phase: 1957–1977

In 1957, a government settlement was established at Maningrida with fresh water pumped from the Djómi spring being the original settlement water supply (see Bunguru *et al*. 2001). The government settlement (like the earlier trading post) was established as an instrument of state policy to keep Aboriginal people from the region from migrating westwards to the Alligator Rivers region and Darwin. This phase

marked the shift of *de jure* state ownership of the resources in this locality to effective control.

On formation of the settlement, many Burarra (from the Blyth River) and Djinang people who had migrated to Darwin by foot were repatriated to Maningrida. They were not traditional owners of the settlement site, but nevertheless collaborated with unknowing white administrators to undermine the authority of the local traditional owners including over resources like water. The formation of the settlement saw many people from the hinterland from diverse language groups gather at Maningrida. Originally the settlement was supposed to be a trading post and medical centre and was not intended to support a large population (Hiatt 1965: 10-11). In fact, according to one version of official policy at the time, people were to be left in their tribal areas with minimum disruption of their social life. However, employment opportunities and 'market linkage' difficulties for those people in the hinterland who wanted to trade meant that Maningrida quickly became a service centre with a significant Aboriginal population (Egan 1957).

In September 1958, Meehan (1982: 19) recorded that 330 Aborigines, speaking at least 7 languages, were living permanently at the settlement (1982: 19). By 1960 there were 480 Aborigines in residence and when it was officially opened in 1962 there was already a hospital, a school, a trade store, an administration building, housing for white staff, an airstrip and market gardens in the township (Altman 1987: 4).

This rapid development of infrastructure correlates with the formal ratification of assimilation as official government policy in 1961 and a change in policy focus. People were subsequently encouraged to centralise and sedentarise and significant effort was made to provide training and employment in preparation for assimilation. In the 1971 census over 1 100 Aborigines and 200 Europeans were counted making Maningrida the fifth largest population centre in the Northern Territory.

What is of crucial significance about this phase is that state colonial authority was exercised in the region on a sustained basis for the first time. This resulted in the introduction of a colonial regime with external agents of the Australian state having legally-sanctioned supreme authority vested in the settlement superintendent. In relation to fresh water this had three main consequences. First, the reticulation of fresh water in Maningrida came under state rather than local Aboriginal control. Second, migration from the hinterland to Maningrida resulted in the establishment of the region's first permanent settlement with a key subsequent repercussion being the need to provide fresh water perennially for domestic use. Third, throughout the 1960s and into the 1970s, a series of state agricultural enterprises were established with the aim of delivering economic development to the region. Most commercial ventures, which are described in more detail below, were heavily dependent on free access to water especially during the dry seasons.

Decolonisation from 1977

A dramatic change of policy from assimilation to self determination in 1972 with the election of the Whitlam Labor government resulted in a significant associated change in the political economy of water. The effective decolonisation of Maningrida meant

that the absolute authority of the Welfare Branch of the Northern Territory Administration abated and residents of the government settlement of Maningrida were no longer regarded as wards of the state. In reality such changes have been in train since the late 1960s, but this policy change had three major ramifications in relation to water. First, the centralisation of people in Maningrida was countered by a decentralisation movement to small outstation communities in the hinterland. Second, this decentralisation was associated with a strong revival of the customary or non-market sector of the regional economy. And third, and most significantly, the introduction of land rights was another strand of the new framework. With the passage of the *Land Rights Act* in early 1977, the Maningrida region, part of the Arnhem Land Reserve, was immediately scheduled as Aboriginal-owned land. Maningrida township and the hinterland were now legally held under inalienable freehold title (the Arnhem Land Trust) and traditional owners were accorded authority over any development on this land. Let us examine each of these major developments with a focus on fresh water.

The outstations or decentralisation movement in Australia is often dated from 1972, but in reality in this region continual movement between the government settlement and the hinterland was a common feature, indeed there are some groups that never centralised. Some groups were coaxed to centralize but did not adapt successfully to settlement life and always spent considerable periods in the hinterland—notable among such groups were Kuninjku-speaking people who were the last to settle at Maningrida in 1963 and among the first to leave a decade later (Altman 1987, 2004a).

As early as 1962 there were reports from the Welfare Branch that despite the availability of formal employment in the settlement, especially for males, many people were leaving town to go out bush at the start of the dry season. In 1965 welfare officers again deplored 'the tendency [of Aboriginal people] to remain at the settlement for a few weeks or months, the adults being sporadically employed, and then move off into the bush' (Northern Territory Administration 1965: 138). By 1968, shortly after the arrival of the cash economy in Maningrida when Aboriginal people were first able to receive social security entitlements and wages in cash, there was a marked increase in seasonal shifts back to specific localities in the hinterland for the performance of ceremonies and participation in the customary economy (Altman 1987: 5; Northern Territory Administration 1969).

One of the more interesting shifts out of Maningrida, in terms of fresh water, was that by Gunartpa-speaking people to their traditional land near the Cadell River in 1968. In accord with the development focus of that time, they established a market garden and a permanent settlement at Gochan Jiny-Jirra that became known to the white authorities as Cadell Gardens. Considerable effort was invested by the state in developing the gardens and in 1969 a pump and piping equipment were imported and an irrigation system was established. This commercial enterprise had some success as water was pumped straight out of the river, but it was contingent, as were other Maningrida enterprises, on heavy subsidisation by the state.

The outstations movement was also associated with growing social tensions in Maningrida associated with the urbanisation of different language groups who had only experienced periodic social interactions in the precolonial era. These tensions

were compounded by a growing white administrative population and colonial race-based divisions in the township (see Hamilton 1970; Elwell 1977; Armstrong 1967; Bagshaw 1977). With self determination many groups demonstrated aspirations to re-occupy their traditional lands in order to protect sacred sites; to re-affirm ownership of land; and to get away from the political tensions in Maningrida. By 1973 some 300 people were residing at outstations and by the time the *Land Rights Act* was passed this number more than doubled to over 600, half the then enumerated regional population (Altman 1982).

The establishment of more permanent outstations from the early 1970s was assisted by small government 'establishment' grants that facilitated the construction of rudimentary housing at particular localities. Importantly, outstations were invariably located near perennial sources of surface water, many of them also sacred sites. Interestingly, even outstations created a degree of sedentary life that had not been possible for hunter-gatherers during the precolonial era. While people continued to move between Maningrida and the hinterland, the outstations movement bifurcated the regional population, at least in the administrative imagination and then in policy, between town and bush residence.

The outstations movement was closely linked to the revitalisation of the customary economy, albeit in a modified form that utilised modern technology. Hunting, fishing and gathering of food was a necessity for living in the hinterland, especially in the early 1970s when unemployment benefits were not paid to Aboriginal people in such remote settings (Meehan 1982; Altman 1987). The customary economy, which will be discussed further below, was based on exploitation of wildlife all of which was water-dependent. At outstations people earned cash from the manufacture of arts and crafts for sale. This activity too required access to natural resources like pandanus and other floral species that were water dependent. While such customary activity was, and continues to be, undertaken in Maningrida, it is of greater significance out bush, owing to both demand and supply factors.

While the *Land Rights Act* vested regional land ownership in the Arnhem Land Trust and returned authority to traditional owners, this ownership did not necessarily extend to crown-owned resources like water. This is especially the case in Maningrida because the new land rights law provided protections for pre-existing state interests that included water infrastructure like bore fields, storage tanks, sewerage ponds and water pipes. This, as we shall see below, is a contentious issue because the *Land Rights Act* protected such infrastructure established before 1977 but required land owner permission for its expansion after that date. This is something that has not occurred in accord with the *Land Rights Act* either in Maningrida or at outstations, the assumption being made that as access to fresh water was for Aboriginal benefit such legal permission was not required.

Recolonisation?: 2007–

It needs to be noted, briefly, that elements of the 'national emergency' intervention of June 2007 that have now been enshrined in the Northern Territory National Emergency Response laws passed in August 2007 can be interpreted as an attempt by the Australian state (the federal government) to recolonise Maningrida township and

re-assert state authority. This is especially the case in relation to the proposed compulsory leasing of the township (including its bore fields and sacred sites holding surface water), compulsory acquisition of assets, and the appointment of a government business manager with absolute authority reminiscent of that enjoyed by the settlement superintendent of the colonial era. The balance of economic and political power in the region could be radically shifted away from local traditional owners to external authorities if these laws are implemented. It is mainly for this reason that traditional owners and the BAC have initiated an action in the High Court that challenges the constitutional validity of these new laws.

Water in the hybrid economy: Sectoral perspective

The postcolonial Maningrida regional economy can only be accurately described and understood if market and non-market sectors are recognised and quantified. The heuristic framework of the hybrid economy has been developed in recent years to demonstrate that the economy in this region has three closely inter-linked sectors, the customary, the market and the state (Altman 2001, 2005). This framework is illustrated diagrammatically and conceptually in Figure 2.

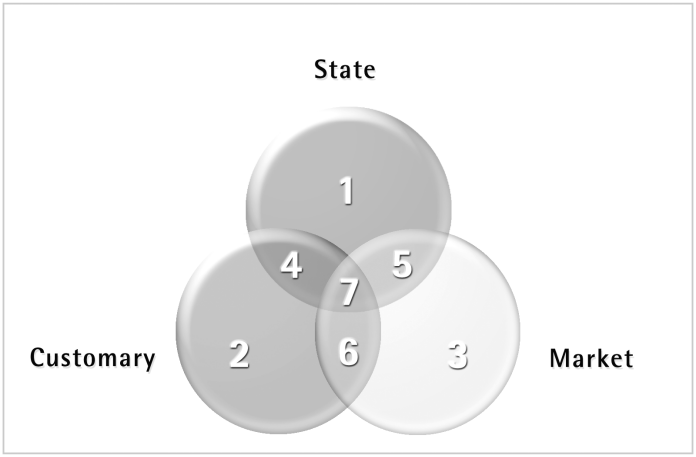

Figure 2. The Hybrid Economy

The hybrid economy of this region is unusual because it has a vibrant customary sector, although the significance of this sector has clearly fluctuated over time and even varies quite markedly within the Maningrida region. The temporal dimension can be linked readily to the historical phases outlined above. In precolonial times the entire economy, by and large, was customary (or non-market), production was predominantly for use although there was some trade via ceremonial institutions. The colonial period marked the arrival of the state and market sectors and the regional economy was radically transformed. During this period and especially in Maningrida the customary sector shrank markedly although many groups retained customary skills via seasonal visits into the hinterland. In the postcolonial period the customary was revived while at the same time the state and market sectors increased. Spatially, the customary sector is clearly of greatest significance at outstations although its

economic significance varies considerably from place to place. It is also noteworthy that while the customary sector is smaller in Maningrida township it is nonetheless in evidence especially in marine fishing and gathering activities in the intertidal zone and in the inflow of bush foods from the hinterland to the township.

At a broad remote Indigenous Australia level, Altman *et al*. (2006) have argued using official statistics that the real economy is the hybrid economy. At the regional level, the hybrid economy has been quantified to estimate the relative dollar (and work effort) values of different sectors (Altman 1987, 2003a). The hybrid economy framework is used principally as an analytic device to highlight the significance of the non-market sector and the extent of sectoral inter-linkages. The following seeks to highlight the role that fresh water plays in each of the economy's three sectors and in the four key segments of inter-sectoral overlap.

It should be noted that the hybrid economy model has been developed to fundamentally challenge the dominant view that economies are only dualistic and consist of public and private sectors only. However, the model is also useful for challenging the consumptive/productive and non-consumptive/unproductive dichotomy that is currently dominating water allocation thinking. As the analysis below will demonstrate, such a dichotomy is false and empirically unsupported from an Indigenous development perspective.

The customary sector

As noted earlier, in precolonial times up until 1957, the dominant mode of production was hunting, fishing and gathering, although clearly people also produced housing, transport and technology. While ethnographic information about this precolonial economy is scant, some certainly exists from reports of patrol officers and from a visit by photographer Axel Poignant to the region in 1952 (see Poignant with Poignant 1996).

Insights into the precolonial mode of living and its relationship to water can be gleaned from extensive field-based research undertaken by Meehan (1982) in 1972 and 1973 and Altman (1987) in 1979 and 1980. Both researchers lived with small Aboriginal groups that continued to utilise terrestrial and marine resources for livelihood. And while in both situations groups have access to market commodities and are engaged with the art market, welfare payments were limited so reliance on the customary economy remained high. Using social accounting and local prices to assess market replacement values, Altman (1987: 53) estimated that the customary sector constituted 64 per cent of the local economy at Mumeka outstation; art and craft sales 10 per cent and social security 26 per cent.

Meehan collaborated with the coastal Gidjingali (Burrarr speaking) people living on the Blyth River floodplain near Kupanga (Gu-panga in Figure 1). In 1972–73, their diet was predominantly made up of resources that were sourced at fresh and salt water places. For example, seasonal swamps were important sites for the collection of spike rush and freshwater turtles by women and for the hunting of duck and geese and a variety of other birds by men (Meehan 1982: 33–34). The zones where fresh and salt

water met were also extremely important for the collection of shellfish and mangrove worms.

It is especially pertinent that access to fresh surface water was a crucial determinant of Gidjingali residential movements to different camping locations, especially during the late dry seasons (Meehan 1982: 27). Inland fresh water wells near specific camp sites were carefully looked after and cleaned out at each seasonal visit to ensure that fresh water flowed freely. An inland sand dune complex protects a series of fresh water swamps skirted by jungle thickets where large wells were dug in precolonial time. Meehan suggests that these wells constituted the only major source of fresh water during the late dry season along the local coastline (1982: 28). Meehan notes seasonal variation in access to fresh water. During the wet seasons the swales behind inland dunes were full of water, but at the end of the dry seasons when access to surface water was difficult, wells had to be excavated to a depth of two metres. Even during large ceremonial gatherings, like for a Kunapipi regional religious ceremony attended by 300 people, water from the wells surrounding the ceremonial camp was potable and remained in plentiful supply for the duration of the ceremony (Meehan 1982: 31).

Altman collaborated with inland riverine Kuninjku speaking groups and resided in the vicinity of Mumeka outstation (see Figure 1). Kuninjku people moved over much larger areas than the Gidjingali and lived in a very different physical environment where surface fresh water was generally abundant. Much of Altman's work focused on the Kuninjku annual seasonal round and how a combination of seasonal access to fresh water and associated resources influenced the location and size of residential groups. People moved between five land system sub-regions that can be classified by the following western terms (that have corresponding Kuninjku names): Arnhem Land Plateau, hills and basins, lowlands, flood plains and river margins and tidal river margins (Altman 1987: 16).

The inter-linkages between seasonal factors, water availability, resource peaks and residential locations were carefully tracked and mapped for a group over a 12 month period (Altman 1987: 23–26). While this seasonal round would change from year-to-year owing to climatic variations, even at the time of fieldwork it accorded closely with oral history accounts of precolonial residence patterns. Ultimately on several occasions it was the drying up of potable sources of surface water that resulted in locational movements; on only one occasion was the digging of a well adjacent to a camp location observed and this well was used to avoid the inconvenience of walking only a few hundred metres to another source of fresh water.

Two important additional observations need to be made here. First, there have been transformations in the local hybrid economy and it is highly likely that the customary sector is less significant than it was nearly 30 years ago, owing to better access to state transfer payments and the growth of the market sector of the economy. However, recent research undertaken in 2002 and 2003 with the same group of Kuninjku speakers at similar localities (see Altman 2003a, 2003b; Altman *et al*. 2002; Hinkson 2003) shows that the customary sector remains vibrant and significant, even though its overall significance has probably declined. For example, in 2002–2003, it has been estimated that in market replacement terms the customary sector may have

declined to 32 per cent of the hybrid economy, not so much because of absolute decline, but because the state sector of the economy has grown significantly (to an estimated 57 per cent) with the introduction of the Community Development Employment Program (CDEP) from 1989 (Altman 2003a). What is especially pertinent is that similar fresh water-linked species are still utilised today at similar locations, although people are more likely to travel by vehicle to harvest wildlife residing on a more permanent basis at Mumeka outstation. This transformation can be explained by better access to vehicles and better bush roads (Altman and Hinkson 2007) and the availability of potable reticulated ground water at the outstation. Interestingly, when people resided on the Bulkay (Tomkinson River) flood plains in July 2002, fresh (ground) water was transported from Mumeka even though surface water admittedly of an inferior potability was readily available.

Second, while most of the detailed research on the customary sector has occurred at outstations, recent work undertaken in November 2007 indicates that the customary sector remains of importance in this urban setting.[3] Bagshaw (2007) has documented that many species of fresh water dependent resources remain of importance to the local Dukúrrdji traditional owners of Maningrida and other residents. And while high quality drinking water is readily available for free, open access surface water is still a highly valued resource.

The market sector

The market arrived in the Maningrida region when a trading post was established in 1949. Items traded included crocodile skins, artefacts and shells, all water-dependent products (Kyle-Little 1957: 234). The market disappeared in 1950 when the trading post was closed. The market sector returned in 1957 with the establishment of Maningrida as a government settlement, although it is perhaps arguable if the water dependent projects instigated from 1958 comprised the market or state sector: certainly production was intended for market sale, but enterprise was almost entirely underwritten by the state.

The following account focuses predominantly on the use of water for commercial agricultural development during the colonial period, in part to document reference to fresh water issues in annual reports of the Welfare Branch of the NT Administration.

By 1958 an agricultural area had already been established, only a year after the settlement, and many types of plants and trees, including apple trees, oranges, limes, avocadoes and coffee plants, were being grown as part of an experimental project (Northern Territory Administration 1959: 68). In addition, a coconut grove had been established along the foreshore. The garden was fitted with a watering system the following year.

By 1962, the agricultural project was well under way and pasture trials, as well as experiments with cotton, were being conducted in conjunction with the Agricultural Branch. Pasture improvement would, it was hoped, enable the future establishment of dairy and cattle projects (Northern Territory Administration 1962: 65). In 1960 a

3 In relation to the Wurridjal & Ors v The Commonwealth High Court challenge to the compulsory acquisition of the Maningrida township lands

forestry project was established along with a tree nursery which housed sufficient seedlings for the planting of up to 5 acres of forest land in the following year, and over 27 000 seedlings were propagated in 1963 (Northern Territory Administration 1960: 52, 1962–63: 59).

By 1964 the dairy and cattle project was operating with 4 paddocks agisting 20 buffaloes, 5 dairy cows, 4 calves and 7 horses (Northern Territory Administration 1964: 120). In addition to this, 300 chickens were also raised. By 1966, the cattle herd had increased to 20 head and to 27 head by 1968, with hopes to expand to a herd of 50 head in the future (Northern Territory Administration 1966: 107). By 1968 new bullock paddocks were constructed and water supply had to be extended there too. The following year saw the arrival of 97 heifers and three bulls from Katherine and the practical phase of the project began under a water conservation regime (1969: 42–43).

Trials were conducted in 1962 to find sites of alternative water supplies in order to support future agricultural development (Northern Territory Administration 1962: 65). By 1963, there was already a documented shortage of water for the gardens. In 1964 and 1965 shortages of water were a major problem for garden irrigation, but new land continued to be cleared for cultivation purposes with 50 additional acres planted in the Gudjarama Creek area and another 120 acres on the fringe of the airstrip. Water was also being used to irrigate a citrus orchard, but despite this the orchard suffered greatly from water shortages in 1968.

In 1968 the Welfare Reports mentioned that domestic water was derived from a water hole two miles to the south-west of the settlement and bores in the airstrip area, two of which were newly drilled but not yet operational (Northern Territory Administration 1968: 153–154). Water for gardening was pumped from the original spring-fed supply at the settlement which was also used for domestic consumption. Water shortages that year, however, not only forced the entire population to be relocated to a permanent water source until the start of the wet season and warranted the closure of the school twice, but also justified the abandonment of an old garden (1968: 156–157). Evacuation of the Maningrida population to sites of surface water availability in the hinterland had already been required owing to water shortage in 1962 and 1966.

This account highlights a number of important issues. First, historically, there has been seasonal shortage of water, although this appears to have now been rectified by the establishment of a bore field. However, the seasonality of climatic conditions meant that commercial agriculture would be highly constrained by the need for capital-intensive water reticulation and irrigation systems for the extended annual dry season. Second, a combination of such seasonal challenges and poor market linkage to Darwin some 500 kms away meant that such projects were commercially marginal at best, even when utilising cheap Aboriginal labour that was only paid 'training allowance' wages. Even attempts at specialisation failed. In the early 1970s a pilot project unsuccessfully sought to grow flowers to be sold through distributors in Adelaide (Northern Territory Administration 1973: 34). By onset of the post-colonial era from 1977, none of these projects remained.

Today, some 30 years on, there are fewer and less ambitious economic enterprises in Maningrida, the majority managed by BAC and underwritten by and large by the

CDEP, arguably a 21st century version of the training allowances wages subsidy of the 1960s and early 1970s. The range of such enterprises that are fresh water dependent are well documented in BAC's annual reports published since 1999–2000 and include: BAC Nursery which propagates and cultivates native plants, as well as vegetables, herbs and flowers; the BAC Djelk rangers who have both men's and women's groups and whose role in resource managing water places is invaluable (and discussed further below); BAC Wildlife that is selling crocodile hatchlings (with wild harvested eggs incubated in Maningrida) and native wildlife for the domestic and international pet market; BAC Tourism that is taking visitors to spectacular water places; the joint venture Arnhemland (*sic*) Barramundi Nature Lodge that focuses on catch and release sports fishing in fresh water creeks and rivers in the region; and the BAC mud brick factory that uses water in brick production. All commercial enterprises in Maningrida run by BAC (and other agencies like the Maningrida Progress Association) currently have unrestricted access to potable domestic water without charge for commercial purposes.

The most significant commercial export from the Maningrida region is art marketed by Maningrida Arts and Culture. This art that has been traded since the days of the trading post in 1949 has gained significant national and international recognition. As we shall see below this production is strongly linked to fresh water in a number of ways. In particular, the raw materials for the production of arts and crafts are sourced from natural resources including natural fibres and dyes that grow in the vicinity of fresh water. Similarly, the bark for paintings comes from the stringy bark tree and is only available seasonally depending on seasonality and rainfall. Most importantly, the designs on paintings and other art objects reflect people's totemic and land ownership rights and these in turn are almost invariably linked to significant fresh water species and places.

The public sector

From the formation of Maningrida as a government settlement in 1957, state authorities took over responsibility for the provision of fresh water for what used to be termed Town Management and Public Utilities: that is, for domestic potable water, sewerage and its management; and for public parks and gardens. It is noteworthy that a long-term urban population, as existed at Maningrida from its establishment, would not have been possible under precolonial conditions. Indeed part of the reason that people were highly mobile was dictated by the lack of availability of potable surface water during the dry seasons. While gaining access to fresh water in precolonial times would have sometimes been arduous at the end of the dry seasons, accounts tell us that water could always be found. Meehan (1982: 34) provides accounts of the distress experienced by people living in small bush camps, especially children and elders, during difficult periods of water shortage. Quarrelling would erupt on a daily basis over whose turn it was to fetch water, often some great distance away from camp, and all able bodied people would contribute to the chore.

There have clearly been changes in people's attitudes to domestic water owing to its more ready availability and the impact of this on seasonal residential patterns. As we shall see later the issue of demand management looms large, even though there is no indication of lack of supply today. Interestingly, the only water users in the

Maningrida region who currently pay for their water are some public sector agencies.[4] All others currently enjoy unlimited access to water without charge.

Sectoral articulations

One of the key features of the hybrid economy model is its recognition of sectoral articulations or overlaps. Conceptually these overlaps are important. Historically, for example, the competing needs for water during the colonial era saw the Maningrida population moved because water demand, that included using water for agricultural enterprises, exceeded supply. This resonates with issues associated with competing rural and urban water needs in Australia generally. No doubt, as ground and surface water is interconnected there is potential for too much use in the market or state sector to impact on availability of non-market resources that are dependent on fresh water. Such sectoral overlaps and associated trade-offs are crucially important in considering how water might be optimally used and how different value systems and property rights regimes might come into conflict over definition of that optimality.

Water administration in town and country: Spatial perspective

Water administration in the Maningrida region is characterised by dualities: there are two forms of water, ground water and surface water; two forms of delivery, assisted reticulation of ground water and open access surface water; two administration regimes, customary and western; and two spatial contexts for domestic water, Maningrida township and 35 outstations in the hinterland. As with the hybrid economy model, there are also significant overlaps in this dual model: people move between town and outstations and hence experience two very different water administration regimes. Maningrida township and outstations cover only a fraction of the region in spatial terms, while a different and informal form of water management is occurring in the rest of the hinterland under the ambit of the Djelk community rangers, but also including the less formal natural resource management activities of people when on country (Altman and Whitehead 2003).

The NT *Water Act 1992* asserts that the NT government owns all water in the Northern Territory (Rea 2005), but in remote contexts like the Maningrida region this is only a theoretical assertion because there is no water control district or water allocation plan for this jurisdiction. What is clear is that two key agencies, PAWA and BAC, take responsibility for water administration in town and country respectively.

4 Information on their water use is very difficult to source from PAWA who currently only individually list government buildings with usage above 300 kilolitres per quarter. Interestingly, it is only the Maningrida police station that falls into this category, with the Maningrida school categorised as a commercial rather than government entity. The distinction between government and domestic is hazy in part because there is limited water metering and in part because some not-for-profit Aboriginal organisations are treated as uncharged domestic users. All told it is estimated from data on two quarters in 2007 that 70 per cent of water use if domestic and 30 per cent government.

The regional population is divided between the township, which is one of the NT's largest, and outstations. The 2006 census count enumerated 1 904 Aboriginal and 156 non-Aboriginal people at Maningrida and 355 Aboriginal and 6 non Aboriginal people at outstations with a total regional population of 2 435 including those of 'not stated' identity. An estimated resident population for Maningrida and outstations is not provided by the Australian Bureau of Statistics because it is not yet a local government area, but it is estimated that Territory-wide there is an undercount of 19 per cent. Assuming that this undercount is consistent across the Northern Territory, the regional Aboriginal population can be factored up by 1.19 to just on 3 000 of which about 5 per cent is non-Indigenous. This is a great deal higher than the 2001 count of 1999 and indicates a high annual growth rate of about 4 per cent.[5]

Today many people in Maningrida divide their time between outstation living (particularly, but not only, during the dry seasons) and township life (particularly, but not only, during the wet seasons). Some live principally at outstations while others, particularly the Gunavidji (Dukúrrdji) as traditional owners of Maningrida (but also many Burarra families that have been in Maningrida since 1957), have settled permanently in the town. As many residents of the region spend extended periods of time at outstations, the distinction between management of water in town or out bush has more to do with government assertion of water property rights and associated management in Maningrida than with the views of Aboriginal people themselves. This is especially the case on traditional owners' estates beyond both town and outstations.

PAWA in town

Formal water administration is limited to Maningrida township where it is managed and delivered by PAWA which also delivers electricity, sewerage and other essential services in the township.

As already noted, historically there has been poor water planning and administration in Maningrida, chosen as a settlement site because of the Djómi spring. A visit in 1960 by Water Resources Branch officers established that water supply in this spring was high, even during the latter end of the dry season (Water Resources Branch 1960). This may have reflected particular annual conditions. Subsequent NT Welfare Branch reports described the lack of water supply which was particularly evident in some uncommonly long dry seasons. In 1962, 1963, and 1967, for example, water shortages forced Maningrida welfare officers to remove people from the settlement to permanent surface waterholes about 10 kms from the township for limited periods of time.

A resistivity survey was undertaken in Maningrida by geologists in June 1973 (Braybrook 1973) after it became evident that low water supply during the dry season could not keep pace with increased demand associated with rapid population growth. The resistivity method resulted in geologists discovering the high yielding ground water regime adjacent to the community described earlier which guaranteed that all future dry season demand would be more than adequately met. Consequently, new

5 It is possible that the undercount was actually greater in the Maningrida region than in the Northern Territory, generally owing to its remoteness.

bores were drilled within a 4 km radius of Maningrida with a depth of approximately 90 metres (in marked contrast to previous bores that had been drilled to between 20 and 40 metre only). The aggregate output from the new bores increased the bore field output sixfold from 400 to 2,400 cubic metres per day (Braybrook 1973: 5).

Consequently at Maningrida water is stored in large tanks adjacent to the bore field and is delivered via township piping to users. The administration of water in the township is a typical Australian township management regime that now offers all local domestic and commercial users a reliable supply. There is even a new swimming pool in Maningrida opened in May 2007 that was constructed as part of a Shared Responsibility Agreement and that will utilise an estimated 5 million litres of potable water per annum.

Importantly, over the past 30 years domestic water has come to be viewed by town residents as a free and seemingly unlimited commodity, at least as far as groundwater is concerned.[6] This view is probably reinforced by the absence of any individual water metering of houses and the absence of any water use charges. At times this results in significant waste of water owing to plumbing or piping problems. In the overall context of local perceptions of water surplus this is hardly regarded as problematic.

BAC at outstations

The water administration regime at outstations has evolved on a totally *ad hoc* unplanned basis since their sustained re-occupation in the early 1970s. At most outstations in the early years domestic water was sourced from surface water from rivers, streams and large billabongs. In some, like at Gochan Jiny Jirra and Kolorbidahdah water was pumped directly from the Cadell River. At other outstations like Marrkolidjban the NT Water Resources Branch had taken responsibility for drilling a bore and providing a wind-mill pump in the early 1970s that is still in place (but not operating today).

From 1978, with self-government the Commonwealth government took responsibility for the delivery of housing and housing related infrastructure to outstations, but it was not until more than a decade later that such investments began to be made on a regular basis. This change coincided with the formation of the Aboriginal and Torres Strait Islander Commission and the development of a National Homelands Policy that would only support outstation establishment and service delivery if each locality had access to potable water (Altman 2006: 6).

In the mid-1990s, BAC became a member of the Australian Drilling Industry Association, purchased a drilling rig and become actively involved in the provision of reticulated ground water to outstations. This was seen as a commercial opportunity as prior to this the Corporation was subcontracting water delivery to PAWA.

During the 1990s, with Community Housing and Infrastructure Program, National Aboriginal Health Strategy and Housing and Infrastructure Priority Program funding,

6 While the latter, a belief in unlimited supply, has probably been a view shared with all Australians till the last few years, the absence of any charging may arguably have amplified this view although some older people do remember the water shortages of the 1960s.

about 35 outstation localities gained access to ground water via the drilling program undertaken by BAC. All these localities now have water reticulation with solar-powered pumps, header tanks and year-round water supply. Water, however, is not reticulated directly into houses but rather to shower blocks and to open access taps and there is no flush sewerage at Maningrida outstations. However, BAC has developed a grey water disposal system that has received NT Department of Housing and Community Services approval and after trialling is regarded as providing industry best practice for remote localities. In particular, the system allows water from absorption trenches to be available for fruit tree watering.

There is no charge for water at outstations and repair and maintenance of water provision to date has been provided by BAC from housing rental payments. The system is well documented and coordinated with information readily available about each bore sunk (in mandatory Final Statement of Bore information required under the NT Control of Water Act), the quality of water, the infrastructure and capacity at each outstation and regular updates of replacement and updating of equipment. Information is also available about outstation infrastructure, estimated service population, GPS way points for bores, and other relevant data.

Paradoxically, in recent years, funding for water provision at outstations and repair and maintenance of equipment (that does depreciate owing to problems with iron bacteria and high pH (alkalinity) of water) has become more uncertain. This is mainly because of the absence of an outstations policy during the Howard government years and an associated antipathy to outstations (Altman 2006). In September 2007, as part of the NT National Emergency Response, the Commonwealth signed a memorandum of understanding with the NT government that included a transfer of outstations services provision to the NT government with an allocation of $20 million.

Djelk rangers on country

The history of non-Indigenous occupation of the Maningrida region has led to significant changes in the ecological balance of the area and has influenced the way people manage their traditional estates. The migration of traditional owners to Maningrida impacted on regional occupation of the land. Many more people are now living in Maningrida either permanently or temporarily with the result that large tracts of hinterland remain unoccupied for periods of time. This, in part, has led to an altered fire regime which had been an essential part of the maintenance of biodiversity, including water features (Gorman *et al.* 2007). Other post colonial impacts have been associated with the introduction of feral animals like water buffalo that arrived before the colonial state and more recently feral pigs (in the 1970s) and cane toads (in the 21st century) and feral weeds like mimosa, gamba grass and mission grass.

The Maningrida region is not a part of the national reserve system, although it is currently looking to be declared an Indigenous Protected Area. Consequently, the rich biodiversity of the region has not been actively protected by any state agency. Under these circumstances, and with the assistance of Natural Heritage Trust and CDEP funding, BAC established the Djelk community ranger project over a decade ago (see Cochrane 2005). The Djelk rangers are in turn a part of the Caring for Country

network that has been auspiced and has grown under the broad umbrella of the Northern Land Council (NLC 2006) , although it must be emphasised that the Djelk project would have occurred irrespective of the NLC.

The Djelk rangers are looking to take responsibility for the management of country and this is closely related to the management of fresh water and especially water quality. This community ranger project is new and under-resourced given the challenges it faces, but discussions with the rangers in June 2007 made it quite clear that they recognise the enormity of the task that they face to maintain regional biodiversity and its inter-linkages with water issues. Three examples of Djelk ranger contributions to water management, in relation to fire, feral animal and exotic weed management, follow.

Without human intervention, fire regimes are characterised by late dry season high intensity fires. They are more frequent in uninhabited land which is not being managed by people and have a destructive effect on biodiversity. In contrast, traditional Aboriginal small intensity mosaic burning regimes, as observed by scientists in the hinterland south of Maningrida and to which the local fauna and flora has become dependent over time, contributes to the maintenance of the biodiversity (Bowman *et al*. 2004). Another consequence of the lack of natural management and human occupation is that access to particular water sites can be made difficult due to the lack of maintenance of both walking and vehicular access tracks. The Djelk rangers participate in the West Arnhem Land Fire Abatement (WALFA) project that aims to abate 100,000 tonnes of carbon emissions from the region (and beyond) by reducing the incidence of late dry season wild fires.

The arrival of the colonial state in the area has also facilitated the intrusion of many exotic pests which have been particularly detrimental to the natural balance of the ecosystem. Feral buffaloes and pigs for example have a destructive impact on the banks of rivers and billabongs where they trample the soil to get access to water. This is of particular concern in watershed areas where such damage has a negative impact for downstream flows, eroding soils and causing turbidity which can destroy otherwise healthy habitats (Altman and Whitehead 2003: 6). Scientific research has also revealed the destructive impact that feral pigs have on native wildlife and particularly on the native Northern long-necked turtle which provides an important seasonal source of protein for communities in the area and who live on or near ephemeral wetlands (Fordham *et al*. 2007: 1).

The presence of exotic weeds has also been identified by the western science community as a major impediment for the maintenance of healthy ecosystems, with travel by cars and boats to and from outstations contributing to spreading those invasive species. Wetland systems which are largely owned by Indigenous communities have been identified as the habitat most susceptible to weed invasion (Douglas *et al*. 1998). The invasion of *Mimosa pigra* into floodplain sedge lands and grasslands for example, results in their conversion into shrublands with lowered floristic diversity and loss of habitat for many birds and lizards (Cowie 2007: 47). *Urochloa mutica*, a foreign weed which also affects floodplains, displaces native vegetation reducing the number of native plant taxa by 75 per cent (Cowie 2007: 47). Terrestrial fauna that relies on

the native ecosystem such as magpie geese, an essential component of Indigenous people's hunted species, become displaced as a result.

The women rangers have been hand-pulling weeds both in and outside Maningrida on the floodplains, while male rangers have been fencing off and destroying outbreaks of mimosa using chemical sprays. In addition, the male rangers have been actively involved in coastal surveillance since 2005 and have been able to detect a large number of foreign and illegal fishing boats (often undetected by government agencies) along the largely sparsely populated coast of Arnhem Land. This work is potentially linked to the maintenance of healthy water sites as a number of major weed species are found in neighbouring Asian countries from which a majority of apprehended vessels originate (Cowie 2007: 49). Early detection of new infestations of exotic weeds is critical to containment.[7]

Spatial interdependencies

The spatial analysis here has tried to emphasise that there are a diversity of spatial interdependencies in the management, control, protection and administration of fresh water in the Maningrida region that is currently not classified as a Water Control District and lacks a Water Allocation Plan. Under such circumstances, formal and informal means to administer fresh water have evolved. For example, PAWA might have primary responsibility for the management of fresh water in Maningrida, but it has been the Natural Heritage Trust and Coastcare that have funded programs undertaken by BAC to eradicate the exotic weed *Gmelina arborea* and deal with erosion on the Maningrida foreshore and in the vicinity of the Djómi spring. Similarly, while BAC provides reticulated water to 32 outstations in the Maningrida region and while the Djelk community rangers have taken responsibility for managing fire, feral animals and exotic weeds in the region, it is outstation residents, people living on country, who will provide the important local knowledge to detect early weed infestation, as well as other changes observed in the surrounding environment. The challenges to effectively manage fresh water places and quality in the massive Maningrida region will need to recognise spatial as well as sectoral inter-linkages.

Regional cultural values associated with water

This section draws upon earlier historical, sectoral and spatial perspectives to provide a cultural perspective on water values. Such an analysis needs to take care to neither create false dichotomies between Indigenous and non-Indigenous values or to essentialise regionally diverse Indigenous values into one homogeneous perspective. Nevertheless, there are clearly commonalities within the Indigenous domain that need to be recognised and explicated. It is only through gaining an understanding of the embeddedness of water in shared regional customary belief and political systems that the emerging contestation over water property rights which we examine next can be understood.

7 Ian Munro (email correspondence 24 March 2008) notes that illegal Indonesian fishers land on the regional coastline to re-supply with fresh water. He notes that these fishers have intimate knowledge of the coastline and fresh water sources possibly passed on intergenerationally.

To recap briefly, historical analysis indicates that Aboriginal people in the Maningrida region are living post-colonially, but their hybrid economy means that they remain strongly engaged with the customary sector that is in turn dependent on water and structured seasonally. A six season cycle, mainly defined in terms of relative abundance or lack of water, structures Aboriginal people's hunting, fishing and foraging activities, in turn organising the daily rhythms of life for those people still largely committed to customary modes of subsistence. This focus on subsistence activity though does not fully capture the significance of water in cultural terms, in the regional or language community-based shared values and beliefs that inform group action in relation to fresh water and water places. Because state colonisation of the region has been relatively late, there are few non-Aboriginal people who have lived in the region for long periods of time and while non-Aboriginal water values dominate through western law and state authority it is quite unclear what significance they have in this particular regional context. Indeed, much of the recent heightened interest in fresh water has been imported to Arnhem Land owing to southern concerns about water shortage and the subsequent intergovernmental National Water Initiative of 2004. Paradoxically, it seems that increasingly externally imposed non-Indigenous values that are locally irrelevant are gaining a foothold in policy discourse about the region, while Aboriginal values that are locally dominant and highly relevant either go unrecognised or, at best, are poorly understood externally.

Much of this divergence occurs because, from a western perspective, water is increasingly a tradeable commodity with a market value or else a non-commercial environmental flow. From a regional Aboriginal perspective the trade-off is not just between commercial and environmental water values, although both are certainly considerations today. Rather, the value of water is more deeply culturally embedded in extant belief systems, in the sentient landscape where water places have special significance and in the political geography of the landscape whereby people affirm their land rights, with boundaries of land holdings often demarcated by key named fresh water places that are invariably sacred sites. In short, water values pervade all aspects of Aboriginal life, livelihood and beliefs in the Maningrida region.

As noted earlier in discussions of the customary sector of the economy, it is clear that deep cultural knowledge of water was, and remains, of fundamental importance to hunter-gatherers—the difference between having and not having knowledge about water and water places can be the difference between life and death. Water is the essential element in a sustaining environment and the sentient landscape it supports; all species are dependent upon water. It follows that water is a fundamental element in Aboriginal cosmology.

Importantly, while the dominant ideology of Aboriginal cosmology is of seasonal water abundance, there is also mythology that tells of water shortage, starvation and death in the Dreamtime in the Arnhem Land escarpment. The Buluwana narrative is important and it confirms the western assessment that in parts of the escarpment surface and ground water can be in short local supply, there is a strong link here between Indigenous and western knowledge. It appears, however, that it is only the Kuninjku who live in the escarpment region that have this myth that describes people dying of thirst. It demonstrates an Indigenous awareness of drought and death despite

a dominant view of annual replenishment and water abundance, to paraphrase, 'fresh water can't finish im up'.

There is a broad cultural difference between western bloc and eastern bloc original creation stories for the Maningrida region: in the west it was a Man and his Son who were the original creators of the anthropomorphic landscape, in the east Two Sisters. However, in both, the Rainbow Serpent Ngalyod is the common great life-giving force for all Aboriginal people (with linguistic variation in terms of the Serpent's name). The potent energy of this Creator-being is volatile and dangerous, requiring people to treat the places it created and inhabits with great care. Ngalyod's force is such that it is credited with producing the continuous water cycles throughout the seasons (Altman and Taylor 2007: 6), hence its appearance as the rainbow.

The CNR Group undertook a study of the social and cultural significance of water for Aboriginal people in the area as part of its scientific assessment of ground and surface water in an effort to support a stronger involvement of Aboriginal people and culture in water resource management (Zaar 2003). The report consists mainly of a collection of stories told by Aboriginal people and artists explaining the links of their paintings, songs, dances and body painting for ceremonial purposes with fresh water.

The theme of the Rainbow Serpent recurs throughout these collected stories. It is associated with the power generated by the monsoonal mid wet season, as well as billabongs and freshwater springs where it is believed to reside. It is responsible for the production of most water plants such as water lilies, algae and palms which grow near water (Zaar 2003: 5–7). The water places where the Rainbow Serpent is believed to reside are sacred sites. Activities at and near those sites are often (but not always) restricted in order to avoid sickness, accidents and even tempests (Zaar 2003: 7).

Clan political alliances made though ceremonies and marriage enable different groups to share resources of those water areas, like floodplains, which are particularly rich in resources. But while access to water for drinking is open, access to places can be heavily regulated by customary social norms. In particular, there are a number of restrictions or taboos that apply to water places and which can be based on age (i.e. ceremonial status), gender, ownership (one needs permission to access another clan's estate) or seasonality. The mid wet season is considered a particularly dangerous time and reptiles and large fish cannot be consumed during these seasons which coincide with species reproduction (Altman 1987: 177). For the Kuninjku there are rigorous taboos during women's reproductive cycles associated with sacred water places and particular species.

Water places are also frequently associated with fecundity and reproduction. Hamilton (1970), in her study of Burrara conceptualisation of reproduction, gave a detailed account of traditional beliefs about means to ensure or avoid pregnancy. Throughout the region there is widespread belief that water sites are conception sites. A spirit-child enters the womb of the woman he/she desires to be his/her mother when the mother enters the waters of a particular sacred water place on one's estate. Alternatively, the spirit-child could change into a freshwater creature, such as a barramundi, when her/his putative father comes to fish. When the man's wife eats the fish the spirit-child would enter the womb of the mother. While nowadays there is broad awareness of limited western notions of reproduction, people still believe that

going to certain water places will result in pregnancy. For example, the Djómi Spring (located in Maningrida township) is a sacred site where Mermaids could make women who swim in the water hole pregnant. Traditional owners Jimmy Bungurru and the late Albert Worrdjol have commented on the fact that this is where whites first settled and drank the water (the first water pump for the town water supply was put there) and the subsequent population explosion in Maningrida can be explained by this according to local beliefs (Ndjébbana Adult Literacy Workshop 2001).

The themes of the life cycle, birth and death and of proliferation associated with water and water places are of fundamental importance to the complex and extant ceremonial life practiced in the Maningrida region. While this is not the place to provide an extended analysis of the regional ceremonial system, some examples from the literature on different groups might provide a sense of the role that water plays in each. For example, in his study of the Djinang Maradjiri ceremony (that is analogous to other regional ceremonies like the Kuninjku Mamurrng or the Kunebeidji Midjan), Borsboom (1978b) illustrates how the birth of a child is celebrated. Such ceremonies include ritual performances that include the dancing of water, with its life giving force. Conversely, mortuary ceremonies associated with the death of a clan's member ensure that the spirit will return to the waterhole from where it came. In the initial washing ceremony fresh water is used to cleanse participants and to ensure that the spirit is assisted in its journey. In mortuary ceremonies, sand sculptures of water places are often manufactured and the washing of spirits into these places associated with the deceased and their personal totems or Dreamings enacted.

The themes of proliferation associated with water and water places are also common amongst traditional myths in the region (Borsboom 1978a). In particular, in sacred regional ceremonies the themes of fecundity, seasonality, totemic species and their associations with particular places are enacted. Such regional ceremonies also provide the jural context for land owners to assert and re-assert their political rights in particular places on their estates by rehearsing sacred knowledge in story, song and dance.

Today, the most open manifestation of people's rights in water and water places is demonstrated in the production of art, an activity that links customary knowledge, often from ceremonial contexts, to market activity. Selling art is an activity that has been undertaken in the Maningrida region since colonisation. To provide a very concrete and contemporary example of the cultural significance of water, a brief analysis was undertaken of the themes in bark paintings produced by the top 26 artists working with Maningrida arts and culture during the first half of 2007.

To summarise, art takes a number of forms including bark painting, sculpting, carving and weaving fibre art. The most fundamental and dominant themes in this art are water myths, water places and water species and abstract and representational iconography that is regionally understood to represent these themes (see Taylor 1996). Some subjects are very clearly associated with fresh water like the water spirits or *Yawkyawk*, a mermaid like figure represented with fish tails and long hair associated with trailing blooms of green algae. As Zaar (2003: 9) notes, these spirits are believed to live in sacred freshwater sites throughout Kuniwnjku estates. *Ngalyod*, the Rainbow Serpent, is another common theme as is *Namarrkun*, the Lightning Spirit, and Sacred

Water Holes and places associated with the Buluwana Myth. And then there are key totemic species associated with particular water places, crocodiles, barramundi, sarratoga, crayfish, turtle, goose, fresh water python, and so on. Sometimes it is particular sacred or profane objects that are linked to water places like a sacred grinding stone or hollow log fish trap (of similar form to a hollow log coffin) or conical fish trap or sacred stones located in creeks that represent particular species like crow.

A case example can be provided with reference to the region's most eminent artist. John Mawurndjul, a Kuninjku artist whose success has grown nationally and internationally in the last 30 years, produces paintings which are mainly inspiried by his clan's stories relating to the land as well as by powerful sites located in the Kurulk clan estate (Kohen 2007: 2). Almost all of his paintings relate to water places and water stories. Interestingly, Mawurndjul established his own outstation at Milmilngkan (see Figure 1) which is located near a creek where *Ngalyod*, the Rainbow Serpent, is said to reside under the water. This sacred place has been a significant source of inspiration for Mawurndjul who produced numerous acclaimed paintings on the subject matter (Altman and Taylor 2007: 6).

In his latest exhibition, *Milmilngkan 2007*, water themes inspired from the Kurulk estate feature predominantly. Rivers, creeks, billabongs, water holes and springs dominate the subject matter and represent spiritually significant places (Altman and Taylor 2007: 6). The identity of the Kuninjku is intimately linked to country and Mawurndjul's paintings, like other Aboriginal artists, provide clear statements about land ownership. By painting country and the mythological stories related to their estate the artist illustrates the spiritual link between country, water and people. The intimate knowledge that Kuninjku have of their country and of the way different water places and features are connected to each other is also reflected in their cosmology and in the resulting art work which shows networks and connections between water holes, springs and rivers.

This brief discussion cannot do justice to the enormously complex and diverse regional cultural values associated with water. Ancestral beings formed the landscape including sacred water places where they still reside in various manifestations. Particular water stories are heavily incorporated in land owner knowledge about particular places including sacred sites which is how traditional owners are able to map their estates. Consequently, sacred or inside knowledge about water places is how traditional owners are able to politically validate their property rights in places to a wider Aboriginal jural public. In this process, external registration of sacred water sites with the Aboriginal Areas Protection Authority also plays an important role, especially if these places are under external threat.[8] Water also plays a crucially important role in regional religious belief systems and their enactment in various forms of ceremony.

8 In most recent fieldwork undertaken with traditional owners of Maningrida in November 2007 in collaboration with anthropologist Geoff Bagshaw it has become very evident that water related sacred sites formed by Dreaming tracks abound within Maningrida township. Such information is rarely volunteered but had been documented in the past (see GreenAnt 1992; Ndjébbana Adult Literacy Workshop 2001). When traditional owner authority is challenged, as with the proposed compulsory leasing of Maningrida township by the Commonwealth as part of the NT National Emergency Response, such information is very forthcoming (Bagshaw 2007).

Ultimately, this brief analysis aims to highlight that according to regional Aboriginal traditions and customs, people do not differentiate between land and fresh water. Indeed during some monsoonal seasons like the mid and late wet any such distinction is difficult to make as large tracts of low lying land is inundated by fresh water. This was made very clear to me during fieldwork unrelated to water undertaken in January 2003 (mid wet season) at Mumeka outstation (Altman 2003b) when a senior collaborator and I walked across country that was often inundated by 500–1000 mm of fresh water: in naming places and demarcating land ownership inundated land was undifferentiated from dry land.

This lack of demarcation was reinforced in June 2007 when undertaking fieldwork focused on water governance. When collaborators were asked questions about land ownership compared with fresh water ownership; or the moiety or clan affiliations of surface and ground water and land, they were invariably undifferentiated: fresh water over Dua moiety land was Dua; over Yirritja moiety land Yirritja. The notion of country from a regional Aboriginal perspective is inclusive of fresh water, a form of inclusiveness that goes well beyond the western notion of riparian right to include all surface and ground water. While from a western legal perspective land and water can be separated as distinct forms of property (as it is in the national Water Initiative), from a customary Aboriginal perspective, the term country actually incorporates water and land. In describing the life-saving virtues of running waters at the start of the wet season, Borsboom (1978a) highlights this interdependence in ceremonial contexts: song cycles shift seamlessly between land based and water Dreamings beginning sometimes with land Dreamings, sometimes with water.[9]

Contestations over water property rights and water governance

The very different western and customary views about water have inevitably created a degree of contestation about who holds primary authority over fresh water. In the Maningrida region, this contestation has been fairly muted in the post-colonial era because there has been no water shortage and no attempt by the state to regulate water usage or to use water changes to manage water demand. This though may be about to change as a result of major local government reforms in the Northern Territory that will see the establishment of shires and associated attempts to implement aspects of the NT Water Act. Under such circumstances, one might see heightened contestation over water ownership, management and administration, and protection, allocation and use.

9 This view has similarities to local views about sea country. In a survey conducted in 1996, informants from the Maningrida area asserted that there were no difference between owning land and sea and furthermore that 'an estate may be comprised of mainland terrestrial, littoral, marine and insular components' (Cooke & Armstrong 2006: 179).

Water ownership

The NT Water Act 1992 asserts at section 9 that the Crown (the Northern Territory government) owns all water. However, there are grounds to believe that this assertion of exclusive property rights in water could be legally challenged on a number of grounds. The Water Act itself notes that land holders have the right to take groundwater and surface water on their land for domestic purposes, wandering stock, and for domestic gardens of up to 0.5 hectares (Northern Territory Government 2008). If water needs exceed this so called 'riparian right' then a water extraction licence is required. Interestingly, under water allocation planning criteria, the range of beneficial uses make no mention of specific Aboriginal uses of water, particularly for customary purposes. For example, beneficial uses might include environmental and cultural flows, but this seems to fail to either acknowledge or comprehend the economic interests in water that traditional owners in the Maningrida region might be currently exercising in the hybrid economy. As we shall see below, Aboriginal land owners in the Maningrida region might take issue with a view that their so-called 'riparian' rights are limited to domestic purposes.

While the analysis here is not strictly legalistic, a number of issues do arise that at the very least might see challenge of the fact asserted in 1992 that the NT government owns all water. For a start, one might consider the position of the *Land Rights Act* and provisions made under its section 74 for its paramountcy if inconsistency arises with a NT law. And while section 73 gives the NT Legislative Assembly certain specific powers to make laws that may affect Aboriginal land like permits and sacred site protection, such laws can only be made to the extent that they can operate concurrently with the *Land Rights Act*. The crucial issue that arises here is whether the ownership rights in water that the NT government acquired in 1992 are compatible with the prior 'riparian rights' to fresh water that might have been attenuated to Aboriginal freehold title (M. O'Donnell, email correspondence, 13 March 2008). Of particular significance here might be the unimpeded access to surface and ground water for livelihood and ceremonial purposes that Aboriginal traditional owners have enjoyed since the gazetting of the Arnhem Land Reserve under Crown Land Ordinances from 1911.

At least four important issues come to mind here that might heighten contestation over property rights in water. First, is the forthcoming decision of the High Court of Australia in the case *Gawirrin Gumana v Northern Territory of Australia (No.2)* generally referred to as the Blue Mud Bay case. If the High Court supports the full Federal Court decision to grant Aboriginal land owners exclusive access to the intertidal zone and tidal rivers above low water mark then this could have ramifications for water property rights. The Blue Mud Bay case rests on the argument that Arnhem Land waters had been reserved for exclusive Aboriginal use to the low water mark. If successful, it could be similarly argued that terrestrial Arnhem Land and its resources, including fresh water, have been similarly reserved.

Second, recent public debates about leasing of Aboriginal townships have raised issues about the protection of the rights and interests of traditional owners. In particular, it is unclear whether PAWA has formal agreement under section 19 of the *Land Rights Act* for the occupation and use of new bore fields and ancillary facilities like water tanks and piping that might have been constructed since the passage of the Act. There seems to be a growing recognition that both the NT and Commonwealth governments

and the Northern Land Council might have failed to enter formal agreements and make appropriate land use payments to traditional owners for the use of their land. This issue might gain high profile if the case *Wurridjal & Ors v The Commonwealth of Australia* proceeds to the High Court.

Third, is the guarantees provided under s211 of the Native Title Act to provide guaranteed access to resources for customary purposes to native title holders. Arguably the domestic purposes and cultural beneficial uses granted under the NT Water Act and the customary purposes of the Native Title Act are similar. However, the possibility arises that if allocation of ground water for a commercial purposes unintentionally impacted on a relevant native title right like hunting, fishing or religious observance at a sacred water site, then compensation for loss or damage might be claimable.

Finally, with the introduction of the NT permit system from 1978, traditional owners in the Maningrida region felt that it was now in their power to exercise more control over the protection of their estates and sacred sites. In a 2004 workshop convened by the Northern land Council with Maningrida traditional owners, concern was expressed about the protection of saltwater, as well as freshwater, sacred sites where commercial fishermen intrude on a regular basis (Northern land Council and Maningrida Traditional Owners 2004). In 2007 the permit system for Maningrida and access roads was abolished by the Commonwealth as part of NT National Emergency Response legislation. The permit system is now awaiting statutory reinstatement, but clearly its existence is linked to the exercise of property rights over fresh water places.

Management and administration

While the NT government has asserted its ownership of water since 1992, its management and administration of water in remote Aboriginal townships like Maningrida (as well as other regional towns) has been rather *ad hoc* and unplanned. As already noted above, in Maningrida there is no distinction made, for example, between treated potable water used for domestic consumption and the use of the same water for horticultural and other commercial purposes. Similarly, there has been an arbitrary distinction made between who is charged for water at Maningrida and who receives water free. To date it appears that NT government agencies like the school, health clinic and police are being charged for use of water at the standard rate of less than $1 per kilolitre, although information on actual levels of use and actual charging is not forthcoming from PAWA. On the other hand, the local Maningrida councils and Aboriginal not-for-profit organisations and businesses are receiving unrestricted access to commercial and domestic use of water free of charge. It is unclear if NT government employees are charged for domestic water use as individual houses in Maningrida are not equipped with water meters.[10]

10 Getting consistent data sets from PAWA was difficult. Arguably the most accurate was information provided from the Maningrida consumption metre that indicated total usage in 2007 of 485,012 ml at an average rate of 1307 ml per day. Assuming that domestic use accounted for about 70 per cent this in turn converted to 915 ml per day or about 300 litres per capita (Aboriginal and non Aboriginal) per day. As already noted, household metering is non-existent at present.

A number of factors might see this absence of planning addressed in future. First, it is likely that there will be growing external political pressure placed on the NT government to comply with the National Water Initiative and establish water control districts and water allocation plans for all parts of the NT. At present the NT government is only focusing its water management planning efforts on water resource 'hot spots' around towns and agricultural development areas. Second, the current NT government's overhaul of the administrative organisation of local governments has the potential to change the way in which water is being administered in communities across the NT. The creation of new Shire Councils from 1 July 2008 might provide an opportune time for the NT government to rethink the way water is being administrated and charged for in regional contexts. There is a strong possibility that all local shire councils might have to pay for their use of water, something that is already in train for the Tennant Creek Town Council. Equity considerations might see charging extended to all Shire councils. Third, there are proposed reforms to leasing arrangements of Aboriginal townships in the NT (under either section 19 or section 19A of the *Land Rights Act*) to ensure the greater provision of more public (as distinct from community) housing to Aboriginal people. While the application of water charges for public housing has likewise been inconsistent across the Territory, with new administrative arrangements it is likely that the NT government will seek to extend the conditions which have already been established in urban centres such as Darwin and Alice Springs to public housing elsewhere.

In the case of Maningrida, it is very likely that a move to develop a water management plan and apply domestic water charges will be met by strong local resistance. This is partly because there is no precedent for such charges, so a user pays system will make people with low incomes considerably poorer. It is also because residents who are traditional owners believe that they must have free access to water from their land. Indeed a senior traditional owner of Maningrida indicated in interview (June 2007) that part of the reason that he did not seek a lease payment for bore fields on his clan land, even if the Crown owned ground water, was because water was provided free of charge to all Maningrida residents. It is also the case that, as noted above, according to local views water is extremely plentiful and its replenishment is due to proper observance of traditions and customs.

The introduction of water reforms and user charges for demand management will in turn raise a number of unanticipated complications that need to be addressed. First, there is the distinct possibility that the introduction of user charges could jeopardise the viability of some commercial and social enterprises that are not currently charged for water use. Second, there is some possibility that with user charges some township residents will go back to accessing surface and naturally-occurring spring water with potential deleterious impacts on people's health in an urban context. There is the associated possible impact of water charges on people's well-being given the overall poverty of the population. Third, as houses in Maningrida are not equipped with meters at present there will need to be a significant investment of scarce resources in meter provision, scarce resources that might be better used in the provision of housing. There is also the distinct possibility that the entire township plumbing infrastructure might need replacement to ensure absence of water leaks.

Given the acknowledged rights of land owners with native title interests in water, the introduction of user charges for domestic water will also raise problems in differentiating between those Aboriginal people with native title rights and those that lack such rights. An unusual situation like Maningrida will raise some real problems in differential treatment of different interest groups and real administrative issues in differentially regulating water access, use and user pays.

Little thought seems to have been accorded to the implications of water reform for outstation communities where water is currently provided without charge and without restriction. One inevitable change that will occur from a combination of the establishment of a regional shire council and the transfer of funds for provision of municipal services from the Commonwealth to the NT government is that there will be a far higher NT government involvement in domestic water provision to outstations. It will be interesting to see if this essential service will continue to be provided by BAC as an Aboriginal organisation or whether it will be provided by PowerWater—Indigenous Essential services, or whether competitive tender decides the provider (both in Maningrida and at outstations).

A combination of all these complicating factors suggests that it is unlikely that water charges will be introduced in Maningrida in the immediate future. Nevertheless, the reality remains that the NT government is likely to view the present provision of water without charge and without any restrictions as problematic given the current dominant perception of water scarcity in Australia generally and attenuated focus on demand management.

Protection, allocation and use rights

The NT Water Act purports to provide for the protection, allocation and use of water resources, but this research suggests that at present protection of water quality is provided by BAC and its Djelk Rangers, that allocation is unregulated and that use rights are asserted rather than legally established. The NT Water Act refers to recreational, social and cultural uses of water, but no reference is made to Aboriginal rights and interests in water.[11] This is clearly problematic in the Maningrida region where there is likely to be contestation about who owns and who controls access to water, particularly in relation to economic development for the long term benefit of the region's Aboriginal land owners and long-term residents.

As shown earlier, the Maningrida regional economy has to be conceptualised as a hybrid of three overlapping sectors, customary, market and state. Regional economic development can occur in one of two ways. First, each of these sectors can expand, that is, there can be more customary activity for livelihood, more market activity, and greater state engagement especially in the equitable provision of services. Second, there can be a shift in the mix of sectoral activity with current policy settings theoretically seeking to expand mainstream private and public sector activity.

11 Jackson (2006: 28–29) has provided a very cogent critique of the distinct category glossed as cultural values associated with Aboriginal interests and values. While this has given Aboriginal people a voice in water planning, it has tended to diminish the significance Aboriginal economic interests in water in the hybrid economy.

Water will clearly play a crucial part in the suite of activities that will facilitate regional economic development. Already there are developments that are seeing an enhanced role for the Djelk Rangers under the Working on Country Program to enhance provision of environmental services underwritten by the public sector. As already shown much of this activity is linked to the management of fire, ferals and weeds all of which impact on water and water places. The Djelk Rangers are also looking to expand their involvement in fire abatement and carbon trading with associated positive spin-offs for regional water quality. Such enhanced community-based initiatives, especially when the region is declared an Indigenous Protected Area, will ensure an ongoing role for local people in protecting water resources.

There are clear links between these activities and a number of other commercial opportunities that BAC is looking to develop for its regional constituency. In 1999, BAC explored the viability of a bottled water export venture owing to the chemical purity of local water. This was not commercially viable at the time but demonstrates how access to water without charge is integral to potential ventures. Similarly other BAC ventures like eco-tourism, recreational fisheries and wild harvesting of wildlife and incubation and hatching of species like crocodiles and turtles are highly dependent on healthy rivers and water areas (Bawinanga Aboriginal Corporation 2007: 30).

In addition to these ongoing business ventures, BAC has identified a number of possibilities for future economic developments (see ACIL 2007). Many of these emerging commercial opportunities have a direct link with water use or water places. and could include buffalo harvesting and scientific monitoring, collection of traditional knowledge of country, extension of fire management on lands, aquaculture of native freshwater and saltwater species, and the expansion of arts production and country-based tourism (ACIL 2007: 16). As a general rule all business developments in Maningrida assume unrestricted water availability at zero marginal cost. Water remains of crucial importance to the maintenance and development of emerging commercial opportunities, as well as for the maintenance of the customary sector of the economy and market export opportunities.

Steps to ameliorate potential cross-cultural water conflict

This report has sought to highlight that, for a variety of historical, cultural, structural and legal reasons, an unusual hybrid economy has emerged in the Maningrida region. Water is integral to this economy but since 1957 to the present there has been no systematic focus on the crucially important issue of fresh water governance. There is no doubt that there are very different views in relation to water held by traditional owners of the Maningrida region and the Australian state that asserts its ownership and management rights in fresh water. Under such circumstances there is clearly cross-cultural contestation about fresh water. This final section looks to outline some possible avenues to ameliorate such contestation to ensure that it does not result in conflict.

This is clearly an opportune moment to look at water issues in this region. At a Commonwealth level there is a focus on water issues in northern regions by the National Water Commission and by the Northern Australia Land and Water Taskforce. At a Northern Territory level there is a proposed focus on Community Water Management Plans for townships like Maningrida by PAWA and for Water Allocation Plans for Water Control Districts by the NT Department of Natural Resources, Environment and the Arts. As the Maningrida region is located within the Arnhem Land Aboriginal Land Trust, the Northern Land Council has a statutory obligation to advise and represent Aboriginal traditional owners in relation to water issues, while when the region is declared an Indigenous Protected Area the federal Department of Environment, Heritage, Water and the Arts will have a role in overseeing the region as a component of the National Reserve System. While the regional BAC has taken a proactive role, through its sponsorship of the Djelk Community Rangers, the whole issue of water management under a western legal framework is very new and poorly understood in the region.

Under these circumstances, the following five recommendations are made to ameliorate potential water conflict in the Maningrida region. In making these recommendations, I realise that some will be harder to address than others, but they are made nevertheless to a diversity of interest groups including the BAC at the regional level and the North Australia Indigenous Land and Sea Management Alliance and the Indigenous Water Policy Group at a broader policy level, as well as to a range of state authorities. These recommendations are made with recognition that the NT government has already commissioned research on Aboriginal perspectives about water in this region (Zaar 2003) and so are aware of some of the fundamental differences and challenges that this intercultural context will present. They are also made in full recognition that the NT water management regime is in its infancy outside the urban centres of Darwin and Alice Springs.

- There is a need to resolve the legal status of water ownership in the Maningrida region. Arguably, this will become clearer during 2008 in the aftermath of the High Court decision in the Blue Mud Bay appeal by the NT government and Commonwealth. Because it is unlikely that there will be a water market in the Maningrida region for some time, there is no urgency in resolving this issue unless plans are made to introduce water charges in Maningrida or at outstations. One danger if introducing such charges prematurely is that such action may precipitate legal proceedings and might exacerbate a situation where it is already unclear if traditional owners are owed compensation for the use of their land for decades without any formal agreement or lease payment. Economic theory also tells us that if there is to be efficiency in the water allocation system in this region then legal uncertainties about the customary/commercial nexus need to be resolved (Altman 2004b; Jackson and Morrison 2007). The lack of clarity about water property rights in the legal space between the NT government's assertion of crown ownership of water and the *Land Rights Act* and *Native Title Act's* statutory recognition of customary water rights and local Aboriginal counter-assertion of their rights needs urgent attention.

- There is a need to start a dialogue with local traditional owners and their mediating organisations about future possible water governance in this region. Future negotiations about water allocations between the NT government and traditional owners might be necessary, and in such circumstances it is important that traditional owners are empowered with information about the NT Water Act. To date, BAC has advocated quite effectively for customary access and use of resources including water and it has provided institutional support to the Djelk Community Rangers who now play a formal role in managing water places. There is a great deal more that needs to be done to build the capacity of local organisations and institutions (Altman and Cochrane 2003) and in recognising the crucial role of Aboriginal organisations in mediating customary water rights and management in such remote regions.

- At a time when there is national focus on issues associated with climate change and national water shortage it might be helpful to take a longer term view on the contributions to the maintenance of water quality and associated biodiversity that the activities of Aboriginal people living on country fulfil. Such natural resource management is generally undervalued and under-resourced by the state; it occurs both formally through institutions like the Djelk Community Rangers but less formally and possibly as or more effectively by people populating this remote landscape and engaging in customary activity. There are some high order threats to water places from feral animals like pigs that require urgent and targeted attention.

- There is a need to ensure consistency in frameworks between Maningrida township and outstations especially as people move on an almost constant basis between them. In particular, there is a need for greater transparency on who currently pays for water in the township and whether this has had an impact in demand management. In undertaking this research, such information has been extremely difficult to access.

- The lack of consistency between township and outstations could prove extremely problematic if any attempt was made to introduce a user pays system in Maningrida. If a Water Management Plan is to be developed it is recommended that this is done on a regional basis but it is again reiterated that there will be a major clash between customary and western perspectives if any attempt were made to charge traditional owners for water from their lands. It is also recommended that such a Water Management Plan is undertaken by a local organisation like BAC that is cognisant of the complicated range of water governance issues raised in this report. Consideration should be given to enabling traditional owners to establish their own water corporation as an economic or social enterprise.

Conclusion: The need for a new intercultural water governance paradigm

This report has examined the current governance of water in the Maningrida region in central Arnhem Land from three perspectives: a historical analysis of the political economy of water; a sectoral analysis of the regional hybrid economy; and a spatial analysis that has differentiated Maningrida township from the hinterland. A cultural analysis was then provided of regional values associated with water before a set of emerging contestations were outlined in relation to water property rights and water governance. This detailed examination from a variety of perspectives was undertaken to highlight the intercultural complexity of contemporary water governance in this region. The analysis has highlighted that much of the complexity of water issues in this region can be attributed to a range of inter-linkages that take us beyond any simplistic and false binaries: in this region it is not simply pre or post-colonial; western or Aboriginal; customary or market; township or outstation; commercial or cultural; consumptive/non consumptive water pools. Rather it is proposed that there are a range of economic and institutional inter-linkages that are captured by the term 'intercultural'.

Aboriginal people, the dominant actors in this region, do not live in accordance with either western or customary social norms, but according to a blend informed by both. The dominant Aboriginal world view in this region is not precolonial, but it remains distinctly Aboriginal and fundamentally different from that of the dominant Australian mainstream. At the same time, there is an extraordinary cultural diversity in this region reflected in the differing views held by different language groups on the rules surrounding the use and value of water, although common basic and fundamental beliefs about water are shared. In particular, in marked contrast to the market focus of the dominant Australian framework for managing fresh water, there is no Indigenous distinction between land and water property rights. This places the dominant regional view about water at loggerheads with the current dominant view of the Australian state incorporated in formal laws governing water.

This is a region which currently lies outside the Water Control Districts that are being declared in areas where there is a need for closer water management regimes: the Maningrida region sits outside the current allocation system. However, there are indications that PAWA propose to undertake a community (township) water management plan in the near future. The evidence presented in this report suggests that such a proposal needs to be carefully considered and if such planning proceeds, it needs to be undertaken independently of the state. A water planning exercise could inflame legal contestation about water property rights in the Maningrida region that could be avoided. Conflict avoidance though may require the adoption of a fundamentally different paradigm for constructively conceptualising water governance in this region. Such a re-conceptualisation will require the state to acknowledge the prior interests of Aboriginal traditional owners not just in land, but also in fresh water. In short, it might require the full allocation of property rights in fresh water to traditional owners as an ongoing means to facilitate regional

development, while at the same time providing incentive for traditional owners to maintain their efforts in water quality protection.

Such an overarching proposal might seem fanciful, except that in other NT contexts commercial interests have been allocated water licences without any charge. Water governance regimes in the NT and elsewhere in Australia are so new and there is so much uncertainty about optimal means to manage water during a period of rapid climate change that the adoption of an innovative new paradigm that empowers Aboriginal traditional owners might be worthy of consideration. This is especially so because distinguishing water property rights from land ownership risks further disempowering Aboriginal land owners; and vice versa, linking water and land rights might provide a means to economically empower Aboriginal people with a resource that is likely to be interlinked with regional development, however defined.

Appendix 1. Maningrida climate summary[12]

Rainfall (1958–2007)

- The mean annual rainfall over the years is 1309.3 mm.
- March generally receives the most water with an average of 293.2 mm.
- August generally receives the least water with an average of 0.1 mm.
- The mean number of days of rain is highest in February with 18.2 days a month and the lowest is in August with 0.1 day a month.
- Days with more than 25 mm of rainfall per day are most frequent in January with 3.6 days a year. 10 mm per day or more is most frequent in February, occurring on average 8 days a month.
- The highest rainfall recorded was 1224.1 mm in March 1981 and the highest rainfall recorded for the dry month of August was 1.5 mm in 1966.
- The lowest rainfall recorded was no rain at all between the months of May till October.
- The lowest recorded rainfall for the wet month of March was 71.8 in 1993.
- The highest daily rainfall recorded was 426 mm in one day in March 1981
- The highest daily rainfall recorded for the driest month of August was 1.3 mm in 1988.

Temperatures (1965–2007)

- Mean maximum temperature over the years is 31.9 degrees Celsius (°C) with November having the highest mean maximum temperature of 33.4°C.
- The highest temperature recorded was 38.4°C in November 1989.
- In the coldest months of June and July, the highest recorded temperature was 34°C in 2003 and 1974.
- The mean number of days above 30°C over an entire year is 297.2 days, with the month of October recording the highest number of such days (29.6 days) and July the least (17.6 days).
- There are very few days above 35°C, with an annual average of 10.7 days, the month of December recording the highest number of such days with 3.7 days. Such temperatures have never been recorded between July and August.
- The mean minimum temperature over the years is 22°C with July recording the lowest average with 17.4°C and December the highest with 25°C.
- The lowest temperature recorded was 7.2°C in July 1965.

Cloud cover (1965–2007)

- There is an average 123.2 cloudy days a year and 75.5 clear days a year.
- Cloud cover is most present between December and March peaking in January with 21.4 days and at its lowest in August with 3.4 days.

Humidity (1965-2007)

- The humidity is at its highest during the month of February with 84 per cent relative humidity in the morning and 78 per cent in the afternoon.

12 Statistics from the Bureau of Meteorology (http://www.bom.gov.au/).

- The humidity is at its lowest in September and October for the morning with 70 per cent and in June and July for the afternoon with 51 per cent.

Evaporation (1967–2007)

- The mean daily evaporation only varies between 4.2 and 6.2 mm throughout the year.

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